

Safety Data Sheet

0. Introduction

Continuous glass fiber products are articles under EU regulation (REACH&CLP), US regulation (TSCA) and Japanese Regulations (Industrial Safety and Health Law, Pollutant Release and Transfer Register) and therefore, no SDS is legally required. GFA decides to continue to provide our customers SDS for assuring the safe handling and use of continuous glass fiber products. This SDS was revised in accordance with GHS.

1. Product and Company Identification

Product name: Continuous Filament Glass Fiber product
Product code: Chopped Strands
Manufacturer: Nippon Electric Glass Co., Ltd.
Address: 906, Imacho, Higashiomi, Shiga 521-1295, Japan
Phone: +81-748-42-2255
Fax: +81-748-42-6995

2. Hazards Identification

GHS classification:

Skin corrosion property · stimulativeness: Category 2 (irritation to skin)
Critical damage and stimulativeness to eye: Category 2B (low irritation to eye)
Specified target organ · general toxicity - single exposure: Category 3 (Irritating to respiratory tract)
*Other hazards are neither applicable nor available.

GHS Label element:

*Continuous glass fiber products are articles and no SDS is legally required. Therefore pictogram is not printed on our product label.

Signal word: Alert

Hazard statement:

Skin stimulativeness
Eye stimulativeness
Irritating to respiratory tract

Precautionary statement:

Contact with fibers can cause temporary irritation or itching to skin, eyes, nose or throat.
Avoid breathing dust and contact with skin or eyes. Follow these work practices:

- Wear long- sleeves, loose-fitting clothes, gloves and eye protection. Use a respirator approved by the national standards, such as a 3M Model 8710 or equivalent.
- Put waste fiber into a bag immediately after chopping and cutting glass fiber to minimize released fibers.
- Wash exposed areas with soap and warm water and gargle after handling.
- Wash work clothes separately from other clothing.
- Consult a physician in case of prolonged irritation, itching or pain.

When chopping, cutting or grinding glass fibers and handling glass powder or milled fiber, use local exhaust ventilation to ensure that the level of floating particles are below safety standards.
Glass fibers are nonflammable, but most sizing and binder agents coated on the fibers are flammable. Fiber fuzz or cotton-like forms are especially easy to catch fire.

- Remove fuzz or cotton-like forms from the ventilation ducts and the working space.
- Clean or vacuum the dust before using a grinding or welding machine.

3. Composition / Information on Ingredient

<u>Chemical name</u>	<u>Common Name</u>	<u>Content Wt.%</u>	<u>CAS No.</u>
Soda zirconia silicate glass	AR-Glass (*1)	>=98	65997-17-3
N/A	Surface treating agent	<2	-

(*1: See attached document 1)

4. First-Aid Measures

Inhalation:

Gargle with clean water about ten times. Also, blow your nose gently. Seek medical attention if you feel some itching or irritation in the nose and/or throat.

Skin Contact:

Do not rub or scratch the affected areas. Rubbing or scratching may cause harsh itching or irritation. Rinse with running water first and then wash with warm water and soap. Bathing is an effective way to remove glass fiber. Seek medical attention if you feel some itching or irritation on your skin.

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Eye Contact:

Do not rub your eyes to prevent irritation and injury to cornea. Flush the eye with clean water for at least 15 minutes. Remove Contact lenses immediately, if present and easy to do. Continue flushing. Seek medical attention if irritation persists.

Ingestion:

Wash mouth with water thoroughly. Seek medical attention if necessary.

5. Fire-Fighting Measures

Suitable extinguishing agent: Any of the extinguishing agents, including water, carbon dioxide gas, foam, dry chemicals and powder are effective. Select an extinguishing agent depending on circumstances (source of fire, etc.).

Suitable extinguishing method: Use any of the ordinary fire extinguishing methods.

Other information: Glass fiber itself is not combustible. But the binders or surface treating agents on glass fiber are generally combustible and give off little hazardous by-products other than carbon monoxide, carbon dioxide and water on combustion.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures: If necessary, wear a safety mask, safety gloves or safety goggles.

Environmental precautions: No special environmental precautions required.

Methods and material for containment and cleaning up: If spilled on the floor, clean quietly so that dust particles will not be dispersed and put into a container or bag. For disposal, treat it same as general industrial waste.

7. Handling and Storage

Handling: Avoid inhalation or contact with the eye or skin. If necessary, use gloves, safety glasses (preferably goggles) and dust mask (approved by the government authorities: replaceable/one-way). Glass fiber is readily charged with static electricity. Static electricity can damage electronic components and cause explosions and fires. Take measures to prevent the build up of electrostatic charge.

Storage: Not applicable

8. Exposure Controls / Personal Protection

Occupational Exposure Limits:

- "Regulation on Prevention of Hazards Due to Dust" of Japan; 3.0mg/m³
- Japan Society for Occupational Health (2011);
2mg/m³ (respirable dust: recommendation), 8mg/m³ (Total dust: recommendation)
- OSHA; 15mg/m³ TWA (total dust), 5mg/m³ TWA (respirable dust)
- ACGIH; 1 fiber/cm³ TWA (respirable fraction)

Equipment measures: Install localized ventilation units in workplaces where dusts are generated by cutting, grinding and so on, and powder products such as milled fibers are handled. If ventilation units can't be installed for some reasons, be sure to wear a dust mask (approved by the government) during work. It is also preferable to provide facilities for washing the face and the body, gargling, changing and washing clothes.

Protective gear: Use the following protective gear as necessary in view of the conditions in the workplace environment.

- Respiratory protection: Dust mask (approved by the government authorities: replaceable / one-way)
 - Hand protection: Gloves such as leather which don't allow glass fiber to pierce
 - Eye protection: Safety glasses (goggle type)
 - Skin and body protection: Loose-fitting top garment with long sleeves and collar (tightened cuffs) and long pants (tightened at the ankles).
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9. Physical and Chemical Properties

Appearance: White glass fiber aggregate, solid

Odor: none

Melting point (°C): (Softening point) approx. 820

Specific Gravity (25°C): Approx. 2.8 (bare glass)

Solubility (in water): Insoluble

10. Stability and Reactivity

Stability: Stable at normal condition

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11. Toxicological Information

Acute toxicity: Not available.

Skin corrosion property-stimulativeness: Category 2. Severe pruritus and irritation incurred from exposure to mechanical stimulus while on the job. These mechanical stimuli were momentary and were related to fibers 5um or greater. Furthermore, dermatitis incurred from exposure to mechanical stimulus while on the job. No abnormalities have been confirmed with a patch test for human skin using 4-13um diameter continuous glass fibers (with no surface treated).

Critical damage and stimulativeness to eye: Category 2B. Mechanical stimuli from exposure while on the job have been confirmed. This mechanical stimulus is momentary, and is related to fibers of 5um or greater. (ACGIH (2001)), ATSDR (2004)).

Respiratory organs sensitization or skin sensitization: Not available

Generative cell mutagenicity: Not available

Carcinogenicity: Not applicable. The International Agency for Research on Cancer (IARC) classes glass fiber into category 3 (No classification exists with regard to its carcinogenicity in humans.).

Reproductive toxicity: Not available

Specified target organ-general toxicity – single exposure: Category 3. Temporary respiratory tract irritation has been confirmed while exposed on the job, but disappears when exposure is removed.

Specified target organ-general toxicity – repetitive exposure: Not available. There is no possibility of inhalation of continuous glass fibers. It has also been reported that no significant adverse affects with regard to one's health have been confirmed through epidemiological studies conducted with laborers.

Aspiration respiratory organs hazard: Not available

12. Ecological Information

Biotoxicity: No data.

Persistence/degradability: No data available.

Bioaccumulation: No data available.

Mobility in soil: No information available.

Harmfulness to ozone layer: No data.

13. Disposal Consideration

For disposal, handle in the same manner as general industrial wastes. Also follow all other concerned laws, bylaws and legal regulations.

14. Transport Information

Not classified as hazardous in the meaning of transport regulation. No correspondence to UN classification and UN number.

15. Regulatory Information

Continuous glass fiber is not classified as a "Dangerous Substance" or "Dangerous Preparation" according to EU-Directives 67/548/EEC, 1999/45/EC and amendments.

Continuous glass fiber complies with all other national or local regulations regarding the use, transport, recycling, reuse, or disposal.

Glass fiber is considered an article and is exempted from requirements of TSCA, REACH, EINECS, DSL, AICS, KECL and so on.

Existing registration of chemical substances in the major countries

- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH regulation in the EU)
 - EINECS No. Not applicable
 - CAS No. Not applicable
 - European Inventory of Existing Commercial Chemical Substances
 - EINECS No. 266-046-0
 - CAS No. 65997-17-3
 - Registered names: Glass, oxide, chemicals
 - Inventory of Toxic Substances Control Act (TSCA) in the US
 - CAS No. 65997-17-3
 - Registered names: Glass, oxide, chemicals
 - Current chemical substances registration in China
 - CAS No. 65997-17-3
 - Registered names: Glass, oxide, chemicals
 - Domestic Substance List in Canada
 - CAS No. 65997-17-3
 - Registered names: Glass, oxide, chemicals
 - Australian Inventory of Chemical Substances in Australia
 - CAS No. 65997-17-3
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- Registered names: Glass, oxide, chemicals
- Korean Existing Chemicals List in Korea
CAS No. 65997-17-3
Korean Existing Chemicals Inventory KE-17630
Registered names: Glass, oxide
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16. Other information

1) Literature references

- Recommendation on maximum allowable concentration (2011) Journal of Japan Society for Occupational Health, Vol. 53 pp.177, 2011.
- Monographs on the Evaluation of the Carcinogenic Risks to Humans, Vol. 81 (2002), "Man-made Vitreous Fibers" International Agency for Research on Cancer (IARC).
- ACGIH (2001)
- ATSDR (2004)
- "Industrial Continuous Glass Fiber Patch Tests for Human Skin" (Test Report Commissioned by the Japan Hair Science Association Incorporated (Hair Science Research Bulletin No. 22044(3) , February 7, 2011))

2) Glass is not a chemical substance registered under the following Japanese laws.

- Law Concerning the Examination and Regulation of Manufacture, etc. of Chemical Substances.
- Law Concerning Reporting, etc. of Releases to the Environment of Specific Chemical Substances and Promoting Improvements in Their Management

3) We have the following domestic laws and bylaws related to occupational safety and health.

- "Regulation on Prevention of Hazards Due to Dust" lay down in the provisions of the Enforcement Ordinance of the "Industrial Safety and Health Law".
- "Instructions on Labor Hygiene for Glass Fiber and Rock wool" (Statement of Principle No.1 by the Director-General of the Labor Standards Bureau at the Ministry of Labor: Jan. 1, 1993)

4) This SDS was revised in accordance with GHS. The information in this SDS has been prepared on the basis of the materials, information and data that are currently available and may be updated or corrected based on new findings. Moreover, cautions apply to normal handling. In the event of special handling take safety measures appropriate for the applications and the methods. The information in this SDS is solely intended for providing information and does not constitute any guaranteed values.

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Appendix 1

AR-Glass Composition

Component	AR-Glass Composition / wt%
SiO ₂	54 - 65
ZrO ₂	16 - 24
RO(MgO+CaO)	0 - 10
(MgO)	—
(CaO)	—
TiO ₂	0 - 10
Al ₂ O ₃	0 - 2
R ₂ O (Li ₂ O+Na ₂ O+K ₂ O)	10 - 30
(Li ₂ O)	—
(Na ₂ O)	—
(K ₂ O)	—

Note :

AR-glass chemical composition is generally described in the above table, where the each component is expressed in oxide according to the rule in the glass industry. However, glass is indeed obtained by a mineralogical process, resulting in a chemical network (matrix). Its constituents are closely linked together and are in a specific chemical environment, totally different from the initial state (in a raw materials) and from that occurring in simple compounds as metals or oxides. Glass is characterized by a continuous and essentially amorphous inorganic macromolecular structure.

Appendix 2

Continuous Glass Fiber and Human Health

- 1) Continuous glass fiber (Continuous glass filament) is generally used as fibers for reinforcing resins such as FRP and FRTP.
- 2) Continuous glass fibers do not come under the provisions concerning "Respirable Fibers" lay down by the World Health Organization (WHO).

Note: The WHO's Definition of "Respirable Fibers": The WHO defines fibrous substances that are inhaled by humans on breathing and thus reach the lungs as "Respirable fibers". The definition specifies respirable fibers as: "a length larger than 5µm, a diameter smaller than 3µm, and an aspect ratio (i.e., ratio of length to diameter) larger than or equal to 3."

Continuous glass fibers do not possess cleavage planes which would allow them to split length-wise into fibers with smaller diameters, rather they break across the fiber, resulting in fibers which are of the same diameter as the original fiber with a shorter length and a small amount of dust (APFE: European Glass Fibre Producers Association, July 2003).

- 3) The International Agency for Research on Cancer (IARC), a sub-organization of the WHO, conducted twice evaluation studies on the "carcinogenicity of manmade mineral fibers in humans" in 1987 and in 2001. In both these evaluation studies, IARC concluded that the classification of continuous glass fibers in Group 3 is appropriate, confirming that there is currently no evidence for the carcinogenicity of continuous glass fibers to humans.

Note: Report statements on continuous glass fibers in the IARC Monograph Man-Made Vitreous Fibres Vol. 81, 2002

- (1) *Two of the plants of the US cohort study manufactured only continuous glass filament. For all workers and for long-term workers from these two plants, no evidence of excess mortality from respiratory cancer was found when compared with local rates. Adjustment for smoking had little effect on the standardized mortality ratio for respiratory cancer. A nested case-control study that included adjustments for smoking and co-exposure also provided no consistent evidence of excess mortality from respiratory cancer.*

The European cohort study reported few data to evaluate cancer risks among workers exposed to continuous glass filament. This study provided no convincing evidence of an elevated risk for lung cancer.

Results were also available from two smaller cohort studies in the USA and Canada. The US cohort study on one continuous glass filament plant, which included a nested case-control study, with information on smoking and co-exposure, provided no consistent evidence of an excess risk for lung cancer. The Canadian cohort study of one continuous glass filament plant did not include an assessment of smoking or co-exposure. This study also provided no consistent evidence of an excess risk for lung cancer.

- (2) *In experiments in which three types of continuous glass filament of relatively large diameter (>3µm) were administered intraperitoneally to rats, no significant increase in tumor response was observed.*

- 4) Continuous glass fibers are not considered as a dangerous substance following the rules of the European Directive 67/548/EC for labeling of dangerous substances and its subsequent amendments. This has been confirmed by the 23rd amendment (Directive 97/69/EC) on Man-made Mineral Fiber where continuous filament glass fibers are not to be labeled either for toxicity, carcinogenicity or irritation.

Note: Labeling is only applicable to glass or rock wool in certain circumstances and refractory fibers, i.e. "insulation wool"

- 5) Germany has added its own regulations to the EU Directive. The German regulations are generally accepted as being the toughest in the world. Yet even these exclude continuous glass fiber from the regulatory scope.

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